REMARKS

This Request for Continuing Examination (RCE) pursuant to 37 CFR §1.114 is filed in response to an Office Action mailed 6/6/2005 which was made Final ("Final Rejection") and the Advisory Action mailed 11/28/2005. The amendment set forth above is provided as a submission accompanying this Request for Continuing Examination (RCE). Claims 1-20 are currently pending. In the above amendment, Claims 1-17 are amended, and Claims 18-20 are newly added. A more detailed discussion of the Claim amendments as they relate to the prior art cited in the Final Rejection follows.

1. In the Office Action dated June 6, 2005 which was made **FINAL**, Claims 1 and 11-15 were rejected under 35 USC §103(a) as being unpatentable over U.S. Patent No. 5,790,435 to Lewis et al. ("Lewis") in view of *Customizing Visio 2000 Software White Paper,* Microsoft Corporation, http://www.microsoft.com/technet/prodtechnol/visio/visio2000/maintain/custom.mspx ("Visio2000")

Before considering the amended Claim language, a summary of Lewis is provided for discussion purposes. Lewis provides an automated mechanism for analyzing timing diagrams and verifying that timing relationships specified for a circuit are met. (Lewis column 2 lines 59-62.) This mechanism requires that a user manually enter a timing diagram into the Diagram Window 36 (Figure 3) using a drawing program and a point-and-click device such as a mouse. This is discussed in Lewis as follows:

> "Signal waveforms 42 are *drawn by an operator with a mouse in the Diagram Window* and comprise an ordered sequence of states and edges." (Lewis column 4 lines 57-60, emphasis added.)

In particular, the various selection buttons shown in Window 36 of Lewis Figure 3 are used along with the point-and-click device to create the waveforms as follows:

> "To insert a new signal, the operator selects an existing signal above which the new signal will be inserted. The New Signal button is clicked and a Signal Attributes dialog box appears..." (Lewis column 9 lines 21-24.)

Once created, the user specifies where the waveform edges should be located for the newly-created signal, as follows:

> "...the pointer tool is positioned where the operator wants the edge using a hair-line on the ruler face as a reference point. The operator then clicks the left mouse button and the edge is added....To move an edge an operator drags the edge using a pointer tool which then appears as the Edge Move tool." (Lewis column 10 lines 41-44 and column 11 lines 37-38.)

A waveform pulse is created as follows:

> "To insert a pulse into a waveform, the operator positions the pointer tool at the desired location and double clicks the left mouse button". (Lewis column 11 lines 10-12.)

Other functions employed by the user to create the timing diagram using a point-and-click device are described throughout Lewis.

From the foregoing, it may be appreciated that in Lewis, the user employs a drawing program to manually create the original timing waveforms within the Diagram Window. These waveforms are not created by any program that is interpreting spreadsheet data.

After the timing diagrams are manually created using the above described process, a user of the Lewis system may then utilize a Parameter Spreadsheet to specify data that describes timing relationships between edges in the previously-created timing diagram. This data includes *numbers* that specify MIN/MAX values for delays, constraints, and signal skews. This data further includes formulas to generate a number for one of the foregoing, as well as variables used in the formulas or instead of a constant. This is described in Lewis as follows:

> "The Parameter Spreadsheet 38 is similar to parameter tables in a component data book ...Each row 74 represents a timing parameter, for

> example, a delay, constraint, signal skew, or variable. The columns within each row 74 define the entry, such as row number 76, and type 78, name 80, formula 82, MIN/MAX 84/86, margin 88 and comment 90." (Lewis column 6 lines 12-19.)

The information from the Parameter Spreadsheet is then used to define relationships between edges of the previously created waveform. For example, a user does the following to specify a delay:

> "...the operator selects the edges involved in the Diagram Window 36, and then specifies, in the Parameter Spreadsheet 38, the MIN/MAX delay time values that the target edge trails the source edge. Once both parts of the delay are in place, then the relative position of the two edges are automatically maintained by the present invention. This means that when the operator moves an edge that is the source or target of the delay, edges associated with that edge also move." (Lewis column 12 lines 41-51.)

Thus, the Parameter Spreadsheet is used to setup relationships between edges so that when a user modifies a waveform within the Diagram Window 36, the relationships are maintained.

From the foregoing, it is apparent that a waveform is ***manually created by a user*** within the Diagram Window. Then, the relative positioning between two edges of the manually-created waveform is defined using parameters (numbers) entered in the Parameter Spreadsheet. It may be noted that this Parameter Spreadsheet ***does not contain any commands*** that are used to actually ***create*** the timing diagram, since the timing diagram is created ***manually by the user***. In fact, this Spreadsheet only contains parameters (numbers), and information describing the parameters (e.g., names and types of the parameters), and does not contain anything that could be interpreted as commands.

Another spreadsheet described as the Library Spreadsheet likewise does not include anything that could be interpreted as actual commands. This spreadsheet is said to "...hold variables only..." (Column 6 line 23.) These variables are those that are used in circuit designs (Column 7 lines 14-15.), such as delay values that are referenced by the formulas of the Parameter Spreadsheet.

Finally, it may be noted that in Lewis, the Diagram Window 36, the Parameter Spreadsheet 38, and the Library Spreadsheet 40 are different windows *of the same program*. This is described in Lewis as follows:

> "FIG. 2 is a flow chart defining the overall logic of ***the computer program*** which directs the operation ***of the present invention***. ***The computer program*** defines a set of states and operations..." (Lewis column 3 lines 62-65, emphasis added.)

This description continues as follows:

> "FIG. 3 illustrates the *three different windows* displayed by *the present invention* on the PC monitor 12: a Diagram Window 36; a Parameter Spreadsheet 38; and a Library Spreadsheet 40..." (Lewis column 4 lines 27-30, emphasis added.)

The same concepts are reiterated as follows:

> "In summary, ***a computer program*** has been described that automates the entry, modification, and verification of timing diagrams for electrical circuits. ***The computer program*** also provides an automated mechanism for analyzing these timing diagrams and verifying the timing relationships specified for the circuit are met using the parts selected for the circuit." (Lewis column 22 lines 53-59, emphasis added.)

Thus, it may be appreciated from the foregoing that the Lewis Diagram Window, Parameter Spreadsheet, and Library Spreadsheet are windows that are supported by the same program. It appears that none of these windows are separate executables that may be executed, or used, apart from the other. That is, the Parameter Spreadsheet does not appear to find any useful purpose apart from the Diagram Window such that a user would choose, or be allowed, to initiate execution of the Parameter Spreadsheet without use of the Diagram Window. This will be discussed further below.

Next, Applicants' invention is considered. In contrast to Lewis, Applicants' invention describes using a spreadsheet that is generated by a spreadsheet program. This spreadsheet includes ***all data*** that is needed to draw a timing diagram, including the states of the signal lines, the locations of all edge transitions, maximum and minimum transition times for the edges, content and location of all labels, locations of any signal glitches, positioning of arrows, content and location of headers, and so on. The spreadsheet ***contains commands*** that are interpreted to cause the drawing of each of the foregoing aspects of a timing diagram. This is discussed in detail on pages 5-14 of Applicants' Specification. Figures 8A – 8D illustrates an exemplary spreadsheet containing these types of commands, which include the "Cycle", "Rpt", "Options", "Mark", "Label", "Glitch", "OpenBox", "CloseBox", "BeginArrow", and "EndArrow" commands. The spreadsheet further includes data, such as times associated with various segments of a particular waveform, the contents of a label, and so on.

After the spreadsheet is created to include the types of data and commands set forth above, it is provided as input to a control program. This control program opens a drawing program, and then automatically interprets the commands contained in the previously-created spreadsheet to control the drawing program so that a timing diagram is *automatically* generated from the data and the interpreted commands. (Applicants' Specification page 4 line 14 – page 5 line 5.) As an example, the commands contained in the spreadsheet of Figures 8A-8D are interpreted by the control program and used to cause the drawing program to automatically generate the timing diagrams of Figures 3A and 3B.

According to one aspect of Applicants' invention, the spreadsheet program that is used to create the spreadsheet, the control program that is used to interpret the spreadsheet, and the drawing program are all independent programs that are capable of being executed independently of one another. In one embodiment, the spreadsheet program is Microsoft® Excel® and the drawing program is VISIO®, however other spreadsheet and drawing programs may be utilized.

As may be appreciated from the foregoing discussion, several important distinctions exist between the system of Lewis and that described in Applicants' Specification as follows:

a.) According to Applicants' system and method, a spreadsheet contains ***all information*** needed to generate one or more signal lines and, if desired, header information for a timing diagram. This information is interpreted by a control program, which operates in conjunction with a drawing program to *automatically generate* a timing diagram. In contrast, in Lewis, *a user employs* a ***drawing program to manually generate*** a timing diagram. Parameters and variables contained in several spreadsheets are then used to create relationships between associated edges of the previously-created timing diagram.

It may be noted that it would be impossible to create a signal waveform or a header solely using the information contained in either or both of the Lewis Spreadsheets. This is because the Lewis Spreadsheets do not contain signal levels, edge positions, and so on. In Lewis, this type of information must be provided manually by a user in the manner set forth above. Thus, ***Lewis*** most certainly ***does not teach a spreadsheet that contains all information*** needed to generate a ***timing signal*** or a header.

b.) According to Applicants' invention, the spreadsheet contains *actual commands* that are interpreted to automatically generate Applicants' timing diagrams. In contrast, no similar commands are contained in the Lewis spreadsheets, which store only parameters (i.e., numbers), equations to generate these parameters, and variables. In fact, by the time the Lewis parameter and variable information is employed to create relationships between waveform edges, the waveform diagrams have already been *manually generated* by the user. Thus, in Lewis, there is no reason to include within the spreadsheets any commands to generate the waveforms.

c.) In contrast to the Lewis system, Applicants' solution is modular. That is, the spread-sheet and drawing programs that are used to implement Applicants' system are independent, and are capable of executing apart from one another. This makes Applicants' system more flexible, since any spreadsheet program that best suits a particular user's needs can be paired with a preferred drawing program.

In contrast to Applicant's approach that uses multiple independent programs, Lewis provides *a single program* that includes multiple windows. One window supports the drawing of timing diagrams, another window supports the storing of parameters, and a third window stores variable lists. This use of a *single program* is reiterated throughout the Lewis Specification, as is summarized above. Because Lewis supports use of only *a single program,* a user cannot "mix and match" to select a preferred spreadsheet program for use with an optimal drawing program, as can be done in Applicants' system.

For at least the foregoing reasons, Applicants' invention is not taught or suggested by Lewis. Moreover, it may be noted that nothing in Visio2000 or the other cited references teach or suggest these aspects described above regarding Applicants' Claimed invention.

Next, the specific language of the Claims is considered in reference to the current rejection. First, Claim 1 is discussed. This Claim is currently amended to recite the step of:

"capturing data from a spreadsheet program data file, said data **including all information needed for generating one or more signal lines of a timing chart**..." (Claim 1 lines 3-5.)

As previously described, nothing in Lewis even suggests using data from a spreadsheet that includes all information needed to generate one or more signal lines of a timing chart. The drawing of signal lines requires information pertaining to signal levels, edge positions, and the like. None of this information is contained within the Lewis Parameter or Library Spreadsheets, and therefore these Spreadsheets could not possibly be interpreted in any way that would allow automated generation of a signal line. In Lewis, this type of information (e.g., signal levels, edge positions, and so on) is *provided manually* by the user through interaction with the buttons of the GUI interface of Diagram Window 36 (Lewis Figure 3), and through use of a point-and-click device. Any Lewis spreadsheet information is used to create relationships between edges only *after* the signal lines are already created. This conventional *manual* use of a drawing program in Lewis *teaches away* from Applicants' approach of generating signal lines automatically using commands contained in a spreadsheet.

In addition to the foregoing, Claim 1 describes the data obtain from the spreadsheet as containing commands, as follows:

> "interpreting, by said drawing program, at least one command contained within said data, each said command to be used by said drawing program to draw one of said signal lines or a header/format line;"

In contrast to Applicants' invention, in Lewis, the spreadsheets do not contain any "commands" of a type that may be interpreted by a drawing program to draw signal lines or header/format lines. Instead, the Lewis drawing program is controlled by manual interaction with the user (e.g., via a point-and-click device.) Moreover, the Lewis spreadsheets contain only parameters, variables, or equations for generating parameters.

For completeness, the Examiner's comments regarding this aspect of the invention are considered. The Examiner cites the contents of the parameter

spreadsheet (e.g., "min", "max", "formula", etc.) as teaching Applicants' commands. (See Final Rejection page 9 line 14.) The cited columns of the spreadsheet contain numbers, formula to generate numbers, or information about the numbers (e.g., parameter names and parameter types). These numbers and related information are not "commands" that can be interpreted by a drawing program to automatically generate a waveform.

Finally, Claim 1 includes the following step:

"automatically generating, by said drawing program, said timing chart having each of said one or more signal lines and said header/format line incorporated therein."

In Lewis, there is no step of using a drawing program to **automatically generate** a timing chart having one or more signal lines and header/format information. The Lewis timing diagrams are generated manually by a user employing a point-and-click device.

For at least the foregoing reasons, Lewis does not suggest the invention described by Claim 1. Moreover, nothing in Visio2000 or the other cited references add anything to Lewis that would suggest the aspects discussed above. For at least these reasons, Claim 1, as current presented, is allowable over the prior art cited in the Final Rejection.

Claims 2-3 depend from Claim 1 and are allowable over the prior art that is cited in the Final Rejection for reasons similar to those set forth in regards to Claim 1. These Claims include additional aspects of Applicants' invention not taught or suggested by this cited prior art.

Next, independent Claim 4 is considered. This Claim describes aspects that are similar to those discussed above in reference to Claims 1. In particular, Claim 4 describes capturing from a spreadsheet data file all information needed to generate a timing chart (Claim 4 lines 6-7.) The Claim further includes interpreting commands contained within the captured data to identify drawing actions to be performed by the drawing program to automatically generate one or more signal lines contained in a timing chart (Claim 4 lines 11-15.) These aspects are not taught or suggested by Lewis, or any of the other cited references, alone or in combination.

Claims 5-9 depend from Claim 4 and include additional aspects not taught or suggested by the cited references. For example, Claim 8 describes the drawing and spreadsheet programs as executing independently from one another. As discussed above, this aspect is not taught or suggested by Lewis, which teaches a single program having multiple windows.

Turning next to independent Claim 10, this Claim includes aspects of Applicants' invention that are similar to those discussed above in regards to Claims 1 and 8. For instance, Claim 10 describes a drawing program that is capable of executing independently from a spreadsheet program (Claim 10 lines 4-5). Claim 10 further describes a software program containing commands and data that include all information required by a drawing program to generate a timing chart (Claim 10 lines 14-15.) Finally, this Claim describes a spreadsheet that contains commands that are interpreted by a software program and by a drawing program to generate the timing charts (Claim 10 lines 13-15.) None of these aspects are taught or suggested by the cited prior art, and Claim 10 is therefore allowable over this art.

Claims 11-20 depend from Claim 10, are allowable for the reasons similar to those discussed above in reference to Claims 1 and 8, and further describe additional aspects that are not taught or suggested by the cited prior art.

To summarize, none of the prior art references cited in the Final Rejection teach or suggest the aspects that are included within the independent Claims, as

discussed above. For at least these reasons, the independent Claims, and the dependent Claims that depend from these independent Claims, are allowable over these cited prior art references. Therefore, a Notice of Allowance is respectfully requested.

Conclusion

This Request for Continuing Examination (RCE) pursuant to 37 CFR §1.114 is filed in response to an Office Action mailed 6/6/2005 which was made Final ("Final Rejection") and an Advisory Action mailed 11/28/2005. The amendment set forth above is provided as a submission accompanying this Request for Continuing Examination (RCE). Claims 1-20 are currently pending. In the above amendment, Claims 1-17 are amended, and Claims 18-20 are newly added. In view of the amendments to the Claims, and the comments set fourth above, it is respectfully submitted that all Claims are now in condition for allowance, and a Notice of Allowance is therefore respectfully requested.

Respectfully submitted,

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